

No.

9000265



THE UNITED STATES OF AMERICA

TO ALL TO WHOM THESE PRESENTS SHALL COME:

Northrup King Co.

Whereas, THERE HAS BEEN PRESENTED TO THE
Secretary of Agriculture

AN APPLICATION REQUESTING A CERTIFICATE OF PROTECTION FOR AN ALLEGED NOVEL VARIETY OF SEXUALLY REPRODUCED PLANT, THE NAME AND DESCRIPTION OF WHICH ARE CONTAINED IN THE APPLICATION AND EXHIBITS, A COPY OF WHICH IS HEREUNTO ANNEXED AND MADE A PART HEREOF, AND THE VARIOUS REQUIREMENTS OF LAW IN SUCH CASES MADE AND PROVIDED HAVE BEEN COMPLIED WITH, AND THE TITLE THERETO IS, FROM THE RECORDS OF THE PLANT VARIETY PROTECTION OFFICE, IN THE APPLICANT(S) INDICATED IN THE SAID COPY, AND WHEREAS, UPON DUE EXAMINATION MADE, THE SAID APPLICANT(S) IS (ARE) ADJUDGED TO BE ENTITLED TO A CERTIFICATE OF PLANT VARIETY PROTECTION UNDER THE LAW.

NOW, THEREFORE, THIS CERTIFICATE OF PLANT VARIETY PROTECTION IS TO GRANT UNTO THE SAID APPLICANT(S) AND THE SUCCESSORS, HEIRS OR ASSIGNS OF THE SAID APPLICANT(S) FOR THE TERM OF *eighteen* YEARS FROM THE DATE OF THIS GRANT, SUBJECT TO THE PAYMENT OF THE REQUIRED FEES AND PERIODIC REPLENISHMENT OF VIABLE BASIC SEED OF THE VARIETY IN A PUBLIC REPOSITORY AS PROVIDED BY LAW, THE RIGHT TO EXCLUDE OTHERS FROM SELLING THE VARIETY, OR OFFERING IT FOR SALE, OR REPRODUCING IT, OR IMPORTING IT, OR EXPORTING IT, OR USING IT IN PRODUCING A HYBRID OR DIFFERENT VARIETY THEREFROM, TO THE EXTENT PROVIDED BY THE PLANT VARIETY PROTECTION ACT (AT. 1542, AS AMENDED, 7 U.S.C. 2321 ET SEQ.)

SOYBEAN

'S64-23'



Attest

Kenneth M. Olson
Commissioner
Plant Variety Protection Office
Agricultural Marketing Service

In Testimony Whereof, I have hereunto set
my hand and caused the seal of the Plant
Variety Protection Office to be affixed
at the City of Washington, D.C.
this 31st day of August in
the year of our Lord one thousand nine
hundred and ninety-two.

Edward Madigan
Secretary of Agriculture

U.S. DEPARTMENT OF AGRICULTURE
AGRICULTURAL MARKETING SERVICE

APPLICATION FOR PLANT VARIETY PROTECTION CERTIFICATE

(Instructions on reverse)

Application is required in order to determine if a plant variety protection certificate is to be issued (7 U.S.C. 2421). Information is held confidential until certificate is issued (7 U.S.C. 2426).

1. NAME OF APPLICANT(S) (as it is to appear on the Certificate) Northrup King Co.		2. TEMPORARY DESIGNATION OR EXPERIMENTAL NO. X8964	3. VARIETY NAME S64-23
4. ADDRESS (street and no. or R.F.D. no., city, state, and ZIP) P. O. Box 959 Minneapolis, MN 55440		5. PHONE (include area code) 612-593-7333	FOR OFFICIAL USE ONLY PVPO NUMBER 9000265 Date Sept. 6, 1990 Time <input type="checkbox"/> A.M. <input type="checkbox"/> P.M. Filing and Examination Fee: \$ 2150. ⁰⁰ Date Sept. 6, 1990 Certificate Fee: \$ 250. ⁰⁰ Date Aug 12, 1992
6. GENUS AND SPECIES NAME Glycine max	7. FAMILY NAME (Botanical) Leguminosae		
8. CROP KIND NAME (Common Name) Soybean		9. DATE OF DETERMINATION March, 1987	
10. IF THE APPLICANT NAMED IS NOT A "PERSON," GIVE FORM OF ORGANIZATION (Corporation, partnership, association, etc.) Corporation			
11. IF INCORPORATED, GIVE STATE OF INCORPORATION Delaware		12. DATE OF INCORPORATION 1976	
13. NAME AND ADDRESS OF APPLICANT REPRESENTATIVE(S), IF ANY, TO SERVE IN THIS APPLICATION AND RECEIVE ALL PAPERS Robert W. Romig Northrup King Co. P. O. Box 959 Minneapolis, MN 55440			
PHONE (include area code):			

14. CHECK APPROPRIATE BOX FOR EACH ATTACHMENT SUBMITTED (Follow INSTRUCTIONS on reverse)

- a. ☒ Exhibit A, Origin and Breeding History of the Variety
- b. ☒ Exhibit B, Novelty Statement.
- c. ☒ Exhibit C, Objective Description of Variety.
- d. ☐ Exhibit D, Additional Description of Variety.
- e. ☒ Exhibit E, Statement of the Basis of Applicant's Ownership.
- f. ☒ Seed Sample (2,500 viable untreated seeds). Date Seed Sample mailed to Plant Variety Protection Office _____
- g. ☒ Filing and Examination Fee (\$2,150) made payable to "Treasurer of the United States."

15. DOES THE APPLICANT(S) SPECIFY THAT SEED OF THIS VARIETY BE SOLD BY VARIETY NAME ONLY AS A CLASS OF CERTIFIED SEED? (See section 83(a) of the Plant Variety Protection Act.)
☐ YES (If "YES," answer items 16 and 17 below) ☒ NO (If "NO," skip to item 18 below)

16. DOES THE APPLICANT(S) SPECIFY THAT THIS VARIETY BE LIMITED AS TO NUMBER OF GENERATIONS?
☐ YES ☒ NO

17. IF "YES" TO ITEM 16, WHICH CLASSES OF PRODUCTION BEYOND BREEDER SEED?
☐ FOUNDATION ☐ REGISTERED ☐ CERTIFIED

18. DID THE APPLICANT(S) PREVIOUSLY FILE FOR PROTECTION OF THE VARIETY IN THE U.S.?
☐ YES (If "YES," through ☐ Plant Variety Protection Act ☐ Patent Act. Give date: _____) ☒ NO

19. HAS THE VARIETY BEEN RELEASED, USED, OFFERED FOR SALE, OR MARKETING IN THE U.S. OR OTHER COUNTRIES?
☐ YES (If "YES," give names of countries and dates) ☒ NO

20. The applicant(s) declare(s) that a viable sample of basic seeds of this variety will be furnished with the application and will be replenished upon request in accordance with such regulations as may be applicable.

The undersigned applicant(s) is (are) the owner(s) of this sexually reproduced novel plant variety, and believe(s) that the variety is distinct, uniform, and stable as required in section 41, and is entitled to protection under the provisions of section 42 of the Plant Variety Protection Act.

Applicant(s) is (are) informed that false representation herein can jeopardize protection and result in penalties.

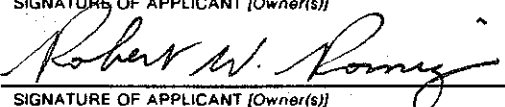
SIGNATURE OF APPLICANT [Owner(s)] 	CAPACITY OR TITLE Vice President, Research	DATE 8/31/90
SIGNATURE OF APPLICANT [Owner(s)]	CAPACITY OR TITLE	DATE

EXHIBIT A

Origin and Breeding History of S64-23

In 1976, the Coker's Pedigreed Seed Company group at Hartsville, SC made the cross J77-46 x (Coker 136*3 x Centennial)F1 from which the variety S64-23 is derived. J77-46 was later released as the variety, Bedford.

The F1 was advanced to F2 in the field at Hartsville in 1977, and the F2 was grown in the field the following year and harvested in bulk. The F3 was grown over winter in the greenhouse during 1978-79 and advanced to F4 using single seed descent. The F4 was grown in the field in 1979 and single plant selections were made at harvest. The F5 progeny from these plants were evaluated for resistance to Race 3 of soybean cyst nematode during the winter of 1979-80. Resistant F5 lines were grown in progeny rows in the field during 1980 and PR #653 was selected and harvested in bulk, and was one of a number of selected progeny rows which were screened as resistant to Race 4 of cyst nematode during the winter of 1980-81. F6 rows were grown at Richland, Indiana during 1981 as part of a "Cyst Nematode Advanced Progeny" nursery and progeny #CNAP118 was selected and harvested in bulk. A further F7 generation of progenies were evaluated at Hartsville during 1982 and row #4329 was selected and again harvested in bulk. At this point the material was classified as early group VI and was moved to the mid-South program then located at West Memphis, Arkansas and was designated Co 83M-32. From 1983-84, Co 83M-32 was evaluated in yield trials throughout the mid-southern United States.

During this period, the line was characterized as having white flowers, tawny pubescence, tan pods, and seeds with a black hilum and absence of seed coat luster. Co 83M-32 was further evaluated in advanced yield trials across a wide range of environments from 1985-89 when, in addition to establishing its yield superiority, it was also found to be resistant to frogeye leafspot and southern root knot nematode. As a result it was decided to release the line as S64-23 in 1989.

Breeder seed was produced in 1988 by bulking seed from similar progeny rows grown and harvested separately over two generations. Foundation seed was produced and approved by the Arkansas State Plant Board in 1989. Varietal purity will be maintained using progeny rows and roguing as needed.

S64-23 is a uniform, stable variety. Occasional off-type plants with purple flowers, tawny pubescence, and brown hilum and a further off-type with white flowers, gray pubescence and buff hilum have been observed. These were assumed to have resulted from mixture. During the seven years of testing and three years of seed increase, we have observed no other off-types except for minor environmentally induced variations in the intensity of hilum pigmentation.

EXHIBIT B (AMENDED)

Novelty Statement for Soybean Variety 'S64-23'

Soybean variety 'S64-23' is most similar to the variety Bedford. It can be differentiated from Bedford on the basis of reactions to Southern root knot nematode (*Meloidogyne incognita*) and to Frogeye leaf spot (*Cercospora sojinae*). Variety 'S64-23' is resistant to Southern root knot nematode whereas Bedford is susceptible. Variety 'S64-23' also has greater resistance to Race 4 of Frogeye leaf spot, as shown in the table below.

Table 1. Average leaf area affected from challenge by spores of *Cercospora sojinae*

Variety	Race 4, Isolate-	
	CS-03	CS-05
	%	%
'S64-23'	3.9	10.6
Bedford	16.6	25.0
Blackhawk (susceptible)	39.4	43.6
Davis (resistant)	0.0	0.0
LSD _{.05}	8.5	13.5

This Frogeye leaf spot test was conducted in a greenhouse at Auburn University in the spring of 1992. Plants were inoculated at the V1-V2 leaf stage with a suspension of spores in water with Tween 20 surfactant at a concentration of from 4×10^4 to 6×10^4 spores/ml. Inoculated pots were placed on a greenhouse bench in a randomized complete block design with four replications (four pots). Scores represent the leaf area affected, as percent, from three leaflets/plant with three plants/pot.

U.S. DEPARTMENT OF AGRICULTURE
 AGRICULTURAL MARKETING SERVICE
 LIVESTOCK, MEAT, GRAIN & SEED DIVISION
 PLANT VARIETY PROTECTION OFFICE
 BELTSVILLE, MARYLAND 20705

EXHIBIT C
 (Soybean)

OBJECTIVE DESCRIPTION OF VARIETY
 SOYBEAN (*Glycine max* L.)

NAME OF APPLICANT(S) Northrup King Co.	TEMPORARY DESIGNATION X8964	VARIETY NAME S64-23
ADDRESS (Street and No., or R.F.D. No., City, State, and Zip Code) P. O. Box 959 Minneapolis, MN 55440 Attention: R. W. Romig		FOR OFFICIAL USE ONLY PVPO NUMBER 9000265

Choose the appropriate response which characterizes the variety in the features described below. When the number of significant digits in your answer is fewer than the number of boxes provided, place a zero in the first box when number is 9 or less (e.g.,).

1. SEED SHAPE:



1 = Spherical (L/W, L/T, and T/W ratios = < 1.2)
 3 = Elongate (L/T ratio > 1.2; T/W = < 1.2)

2 = Spherical Flattened (L/W ratio > 1.2; L/T ratio = < 1.2)
 4 = Elongate Flattened (L/T ratio > 1.2; T/W > 1.2)

2. SEED COAT COLOR: (Mature Seed)

1 = Yellow 2 = Green 3 = Brown 4 = Black 5 = Other (Specify) _____

3. SEED COAT LUSTER: (Mature Hand Shelled Seed)

1 = Dull ('Corsoy 79'; 'Braxton') 2 = Shiny ('Nebsoy'; 'Gasoy 17')

4. SEED SIZE: (Mature Seed)

Grams per 100 seeds

5. HILUM COLOR: (Mature Seed)

1 = Buff 2 = Yellow 3 = Brown 4 = Gray 5 = Imperfect Black 6 = Black 7 = Other (Specify) _____

6. COTYLEDON COLOR: (Mature Seed)

1 = Yellow 2 = Green

7. SEED PROTEIN PEROXIDASE ACTIVITY:

1 = Low 2 = High

8. SEED PROTEIN ELECTROPHORETIC BAND:

1 = Type A (SP^{1a}) 2 = Type B (SP^{1b})

9. HYPOCOTYL COLOR:

1 = Green only ('Evans'; 'Davis') 2 = Green with bronze band below cotyledons ('Woodworth'; 'Tracy')
 3 = Light Purple below cotyledons ('Beeson'; 'Pickett 71')
 4 = Dark Purple extending to unifoliate leaves ('Hodgson'; 'Coker Hampton 266A')

10. LEAFLET SHAPE:

1 = Lanceolate 2 = Oval 3 = Ovate 4 = Other (Specify) _____

11. LEAFLET SIZE:

☒ 21 = Small ('Amsoy 71'; 'A5312')
3 = Large ('Crawford'; 'Tracy')

2 = Medium ('Corsoy 79'; 'Gasoy 17')

12. LEAF COLOR:

☒ 21 = Light Green ('Weber'; 'York')
3 = Dark Green ('Gnome'; 'Tracy')

2 = Medium Green ('Corsoy 79'; 'Braxton')

13. FLOWER COLOR:

☒ 1

1 = White

2 = Purple

3 = White with purple throat

14. POD COLOR:

☒ 1

1 = Tan

2 = Brown

3 = Black

15. PLANT PUBESCENCE COLOR:

☒ 2

1 = Gray

2 = Brown (Tawny)

16. PLANT TYPES:

☒ 21 = Slender ('Essex'; 'Amsoy 71')
3 = Bushy ('Gnome'; 'Govan')

2 = Intermediate ('Amcor'; 'Braxton')

17. PLANT HABIT:

☒ 1

1 = Determinate ('Gnome'; 'Braxton')

2 = Semi-Determinate ('Will')

3 = Indeterminate ('Nebsoy'; 'Improved Pelican')

18. MATURITY GROUP:

☒ 91 = 000
9 = VI2 = 00
10 = VII3 = 0
11 = VIII4 = I
12 = IX5 = II
13 = X

6 = III

7 = IV

8 = V

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

BACTERIAL DISEASES:

☒ 2Bacterial Pustule (*Xanthomonas phaseoli* var. *sojensis*)☒ 1Bacterial Blight (*Pseudomonas glycinea*)☒ 2Wildfire (*Pseudomonas tabaci*)

FUNGAL DISEASES:

☒ 1Brown Spot (*Septoria glycines*)Frogeye Leaf Spot (*Cercospora sojae*)☐

Race 1

☐

Race 2

☐

Race 3

☒ 2

Race 4

☐

Race 5

☒ 2

Other (Specify)

☐Target Spot (*Corynespora cassicola*)☐Downy Mildew (*Peronospora trifoliorum* var. *manshurica*)☒ 2Powdery Mildew (*Microspheera diffusa*)☐Brown Stem Rot (*Cephalosporium gregatum*)☐Stem Canker (*Diaporthe phaseolorum* var. *caulivora*)

Intermediate Resistance

5

19. DISEASE REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant) (Continued)

FUNGAL DISEASES: (Continued)

☐ Pod and Stem Blight (*Diaporthe phaseolorum* var. *sojae*)
☐ Purple Seed Stain (*Cercospora kikuchii*)
☐ Rhizoctonia Root Rot (*Rhizoctonia solani*)
 Phytophthora Rot (*Phytophthora megasperma* var. *sojae*)
☒ Race 1 ☒ Race 2 ☒ Race 3 ☒ Race 4 ☒ Race 5 ☒ Race 6 ☒ Race 7
☒ Race 8 ☒ Race 9 ☐ Other (Specify) _____

VIRAL DISEASES:

☐ Bud Blight (Tobacco Ringspot Virus)
☐ Yellow Mosaic (Bean Yellow Mosaic Virus)
☐ Cowpea Mosaic (Cowpea Chlorotic Virus)
☐ Pod Mottle (Bean Pod Mottle Virus)
☐ Seed Mottle (Soybean Mosaic Virus)

NEMATODE DISEASES:

Soybean Cyst Nematode (*Heterodera glycines*)
☐ Race 1 ☐ Race 2 ☒ Race 3 ☒ Race 4 (14) ☐ Other (Specify) _____
☐ Lance Nematode (*Hoplolaimus Colombus*)
☒ Southern Root Knot Nematode (*Meloidogyne incognita*)
☐ Northern Root Knot Nematode (*Meloidogyne Hapla*)
☒ Peanut Root Knot Nematode (*Meloidogyne arenaria*)
☐ Reniform Nematode (*Rotylenchulus reniformis*)
☐ OTHER DISEASE NOT ON FORM (Specify): _____

20. PHYSIOLOGICAL RESPONSES: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

☐ Iron Chlorosis on Calcareous Soil
☐ Other (Specify) _____

21. INSECT REACTION: (Enter 0 = Not Tested; 1 = Susceptible; 2 = Resistant)

☐ Mexican Bean Beetle (*Epilachna varivestis*)
☐ Potato Leaf Hopper (*Empoasca fabae*)
☐ Other (Specify) _____

22. INDICATE WHICH VARIETY MOST CLOSELY RESEMBLES THAT SUBMITTED.

CHARACTER	NAME OF VARIETY	CHARACTER	NAME OF VARIETY
Plant Shape	Bedford	Seed Coat Luster	Coker 136
Leaf Shape	Centennial	Seed Size	Bedford
Leaf Color	Stonewall	Seed Shape	Coker 136
Leaf Size	Centennial	Seedling Pigmentation	Coker 136

23. GIVE DATA FOR SUBMITTED AND SIMILAR STANDARD VARIETY: Paired Comparison Data

VARIETY	NO. OF DAYS MATURITY	PLANT LODGING SCORE	CM PLANT HEIGHT	LEAFLET SIZE		SEED CONTENT		SEED SIZE G/100 SEEDS	NO. SEEDS/POD
				CM Width	CM Length	% Protein	% Oil		
S64-23 Submitted	154	2.2	102	8.5	13.3	35.2	16.4	13.4	2-3
RA606 Name of Similar Variety	156	2.2	99	5.9	11.5	35.1	16.7	12.2	2-3

PUBLICATIONS USEFUL AS REFERENCE AIDS FOR COMPLETING THIS FORM:

1. Caldwell, B.E., ed. 1973. Soybeans: Improvement, Production, and Uses. Amer. Soc. Agron. Monograph No. 16.
2. Buttery, B.R. and R.I. Buzzell. 1968. Peroxidase activity in seeds of soybean varieties. Crop Sci., 8: 722-725.
3. Hymowitz, T. 1973. Electrophoretic analysis of SBTi-A₂ in the USDA soybean germplasm collection. Crop Sci., 13: 420-421.
4. Payne, R.C. and L.F. Morris. 1976. Differentiation of soybean cultivars by seedling pigmentation patterns. J. Seed Technol. 1: 1-19.

EXHIBIT E

Statement of the Basis of Applicant's Ownership

Soybean variety S64-23 was developed by the Northrup King Co. soybean breeding staff from germplasm sources cited in Exhibit A of this application. Northrup King Co. believes that the variety is novel as defined in the Plant Variety Protection Act and, therefore, that Northrup King Co. is the sole owner of the variety.